UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/613,623	07/03/2003	Gregory J. McRae	037010-0201	4384

30542 7590 06/21/2007

FOLEY & LARDNER LLP
P.O. BOX 80278
SAN DIEGO, CA 92138-0278

EXAMINER	
CRAIG, DWIN M	

ART UNIT	PAPER NUMBER
2123	

MAIL DATE	DELIVERY MODE
06/21/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/613,623	MCRAE ET AL.	
	Examiner	Art Unit	
	Dwin M. Craig	2123	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 April 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-45* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-45* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *11 April 2007* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-45 have been presented for reconsideration based on Applicants' arguments.

Response to Arguments

2. Applicants' arguments presented in the 4/11/2007 responses have been fully considered: the Examiner's response is as follows:

2.1 The Examiner thanks the Applicants' for amending the specification with the serial number of U.S. non-provisional application, 10/613,706 and hereby withdraws the objection to the specification.

2.2 Regarding Applicants' response to the 35 U.S.C. 101 rejections of claims 1-45, Applicants' argued that the current claim language discloses a useful concrete and tangible result as required by said statute.

Page 3, section [0010] of the specification reads, *"A module may include a process, a sub-process, a mechanism, an algorithm step, a calculation or a software package simulation..."* the Examiner's rejections were based on the following analysis: the *modules* in claims 1 & 6 consist of mathematical algorithms, which are non-statutory, an abstract idea, the *modules* in the system claims 13, 17, 24 and 28 are *software* which are non-statutory and the program product claims 35 and 39 are not embodied on a computer readable medium, which is required for the claims to be directed to statutory subject matter, see MPEP 2106.01 regarding data having to be embodied on a computer readable medium in order it to be considered statutory. Therefore, based on the recitations of the claims themselves and a reasonable interpretation of the material as disclosed in the specification, the claims are directed to non-statutory subject matter.

Applicants' arguments are therefore respectfully traversed the previously applied 35 U.S.C. 101 rejections of the claims is maintained.

2.3 Regarding Applicants' response to the 35 U.S.C. 103(a) rejections of claims 1-45, Applicants' argued on page(s) 7&8 of the 4/11/2007 responses, *"As described in detail in the specification, the use of a probabilistically equivalent model can significantly increase the efficiency of an uncertainty analysis for a particular module, as well as for a system of multiple modules, Accordingly, independent claim 1 recites "generating a probabilistic equivalent model of said module ""* and *"Applicant respectfully notes that no one skilled in the art would consider a Monte Carlo analysis to be functionally equivalent to the use of a probabilistically equivalent model"*.

The Examiner respectfully traverses Applicants' arguments, regarding the teaching of a probabilistic equivalent model, the MPEP states that the claims are to be interpreted using the plain meaning, see section 2111.01, further and in regards to Applicants' remarks, while Applicants' opine that the claimed probabilistically equivalent model is *described in detail* in the specification, Applicants' have failed to set forth where exactly this detailed description is definition of the claimed probabilistically equivalent model and how this description varies from the teachings cited in the previous Office Action. Further and in regards to interpreting the claim language, the examiner is prohibited from *reading limitations into the claims form the specification*, see MPEP 2111.01 "IT IS IMPROPER TO IMPORT CLAIM LIMITATIONS FROM THE SPECIFICATION".

Regarding the Applicants' argument that an artisan of ordinary skill would not consider a Monte Carlo analysis to be functionally equivalent to the use of a probabilistically equivalent

model, the Examiner notes that this is argument and is not supported by an affidavit or any documented evidence and further that the previous rejections was based on reasonable interpretation of the claim language based on the PLAIN MEANING of the claim language.

The previously applied rejections will be maintained.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 1-45 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Applicants' claim language is directed towards *a system*, however the claimed system is a series of software modules and is therefore disclosing non-functional descriptive material and therefore fails to fall into a statutory category of patentable subject matter further, the claimed subject matter fails to disclose or suggest a *useful, concrete and tangible result* as required.

See section 2107 of the August 2006 revision of the MPEP.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1, 13, 24, 35 and 4, 16, 27, 38 are rejected under 35 U.S.C. § 103(a) as being unpatentable over US Patent 6,549,854 Malinverno in view of "OPEN SOURCE SIMULATION MODELING LANGUAGE (SML)" by Richard A. Kilgore hereafter referred to as *Kilgore*.

4.1 As regards independent claims 1, 13, 24, 35 and using independent claim 1 as an example, *Malinverno* teaches, *a method of analyzing uncertainties in a system having at least two modules,* (Figure 1 reference 10 "CREATE MODEL AND INITIAL UNCERTAINTY ESTIMATE" and reference 16 and reference 24 and the descriptive text and more specifically Col. 4 lines 33-40) *comprising: propagating an uncertainty distribution associated with each of*

a set of inputs through a module to produce an uncertainty in a set of outputs of said module; (Figure 1 reference 24 "UPDATE MODEL AND UNCERTAINTY ESTIMATE" and the descriptive text and more specifically Col. 5 lines 16-56) *generating a probabilistically equivalent model of said module, said equivalent model producing a model of said outputs;* (Figure 5 and Col. 6 lines 53-67 and Col. 7 lines 1-30 the quantification of uncertainty using a Monte Carlo method is functionally equivalent to *generating a probabilistically equivalent model*),

However, *Malinverno* does not expressly disclose, *and providing said model of said outputs in a common data architecture for use as inputs by any other module in said system.*

Kilgore teaches *and providing said model of said outputs in a common data architecture for use as inputs by any other module in said system* (Abstract page 607).

Malinverno and *Kilgore* are analogous art because they are from the similar problem solving area of performing mathematical analysis and simulation using a computer.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to have used the software simulation methods of *Kilgore* with the uncertainty analysis methods of *Malinverno.*

The suggestion for doing so would have been to improve the quality of common core simulation functions, improve the potential for creating reusable modeling components from those core functions, and improve the ability to merge those components using XML, HLA and other simulation community standards. *See Abstract page 607 of Kilgore.*

Therefore, it would have been obvious to combined *Kilgore* with *Malinverno* to obtain the invention specified in claims 1, 13, 24, 35 and 4, 16, 27, 38.

4.2 As regards dependent claims 4, 16, 27 and 38 *Malinverno* discloses *wherein said propagating said uncertainty distribution uses a Monte Carlo method* (Col. 2 lines 36-49).

5. Claims 2, 14, 25, 36 and 3, 15, 26, 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Malinverno* as modified by *Kilgore* as applied to claims 1, 13, 24, 35 and 4, 16, 27, 38 above, and further in view of *Sepulveda et al.* US Patent 6,173,240.

Malvinverno as modified by *Kilgore* teaches a system of uncertainty analysis that outputs to a common data architecture for the reasons above, differing from the invention as recited in claims 2 & 3 in that their combined teaching lacks

(claims 2, 14, 25 and 36) wherein said probabilistically equivalent model is a deterministically equivalent model,

(claims 3, 15, 26 and 37) wherein said deterministically equivalent model is a reduced-order model.

Sepulveda et al. teaches (claims 2, 14, 25 and 36) wherein said probabilistically equivalent model is a deterministically equivalent model, (Col. 5 lines 25-45),

(claims 3, 15, 26 and 37) wherein said deterministically equivalent model is a reduced-order model (Col. 8 lines 20-25).

Malvinverno as modified by *Kilgore* and *Sepulveda et al.* are analogous art because they are all related to simulation and modeling.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the uncertainty modeling methods of *Sepulveda et al.* in the uncertainty modeling methods of *Malvinverno* as modified by *Kilgore* because *Sepulveda et al.*

teaches there is a need in the art to perform *Monte Carlo* sampling in less time (see *Sepulveda et al.* Col. 2 lines 61-64).

6. Claims 6, 17, 28, 39 and 7, 18, 29, 40 are rejected under 35 U.S.C. § 103(a) as being unpatentable over US Patent 6,549,854 *Malinverno* in view of "OPEN SOURCE SIMULATION MODELING LANGUAGE (SML)" by Richard A. Kilgore hereafter referred to as *Kilgore.*

6.1 As regards independent claims 6, 17, 28 and 39 and using independent claim 6 as an example, *Malinverno* teaches, *a method of analyzing uncertainties in a system, comprising: substituting at least one of a plurality modules of a system with a corresponding probabilistically equivalent module model, said equivalent module model adapted to propagate uncertainties in inputs of said module to outputs of said module;* (Figure 1 reference 10 "CREATE MODEL AND INITIAL UNCERTAINTY ESTIMATE" and reference 16 and reference 24 and the descriptive text and more specifically Col. 4 lines 33-40 and Figure 5 and Col. 6 lines 53-67 and Col. 7 lines 1-30), *providing outputs of each of said modules and substituting said plurality of modules with a single probabilistically equivalent system model for propagating uncertainties in system inputs to system outputs* (Figure 1 reference 24 "UPDATE MODEL AND UNCERTAINTY ESTIMATE" and the descriptive text and more specifically Col. 5 lines 16-56).

However, *Malinverno* does not expressly disclose, *a common data architecture.*

Kilgore teaches *a common data architecture* (Abstract page 607).

Malinverno and *Kilgore* are analogous art because they are from the similar problem solving area of performing mathematical analysis and simulation using a computer.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to have used the software simulation methods of *Kilgore* with the uncertainty analysis methods of *Malinverno*.

The suggestion for doing so would have been to improve the quality of common core simulation functions, improve the potential for creating reusable modeling components from those core functions, and improve the ability to merge those components using XML, HLA and other simulation community standards. *See Abstract page 607 of Kilgore.*

Therefore, it would have been obvious to combined *Kilgore* with *Malinverno* to obtain the invention specified in claims 6, 17, 28, 39 and 7, 18, 29, 40.

6.2 As regards dependent claims 7, 18, 29 and 40 *Malinverno* teaches *providing an optimization module for optimizing an objective function, said optimization module adapted to receive said system outputs and to vary said system inputs* (Col. 8 lines 10-21).

7. Claims 8-12, 19-23, 30-34 and 41-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Malinverno* as modified by *Kilgore* as applied to claims 6, 17, 28, 39 and 7, 18, 29, 40 above, and further in view of *Sepulveda et al.* US Patent 6,173,240.

Malvinverno as modified by *Kilgore* teaches a system of uncertainty analysis that outputs to a common data architecture for the reasons above, differing from the invention as recited in claims 8-12, 19-23, 30-34 and 41-45 in that their combined teaching lacks

(claims 8, 19, 30, 41) wherein said objective function is a weighted function of two or more output parameters.

(claims 9, 20, 31, 42) wherein said probabilistically equivalent model is a deterministically equivalent model.

(claims 10, 21, 32, 43) wherein said deterministically equivalent model is a reduced-order model.

(claims 11, 22, 33, 44) wherein said probabilistically equivalent system model is a deterministically equivalent model.

(claims 12, 23, 34, 45) wherein said deterministically equivalent model is a reduced-order model.

Sepulveda et al. teaches (claims 8, 19, 30, 41) said objective function is a weighted function (Col. 3 lines 19-32),

(claims 9, 20, 31, 42 and 11, 22, 33, 44) wherein said probabilistically equivalent model is a deterministically equivalent model, (Col. 5 lines 25-45),

(claim 10, 21, 32, 43 and 12, 23, 34, 45) wherein said deterministically equivalent model is a reduced-order model (Col. 8 lines 20-25).

Malvinverno as modified by *Kilgore* and *Sepulveda et al.* are analogous art because they are all related to simulation and modeling.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the uncertainty modeling methods of *Sepulveda et al.* in the uncertainty modeling methods of *Malvinverno* as modified by *Kilgore* because *Sepulveda et al.* teaches there is a need in the art to perform *Monte Carlo* sampling in less time (see *Sepulveda et al.* Col. 2 lines 61-64).

Conclusion

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dwin M. Craig whose telephone number is (571) 272-3710. The examiner can normally be reached on 10:00 - 6:00 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul L. Rodriguez can be reached on (571) 272-3753. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Dwin McTaggart Craig

PAUL RODRIGUEZ
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2